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Paper leads to enhanced public safety decision making for bomb detection

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Download the paper: “Bomb Detection Technology Solutions”

Former fire captain, Douglas Weeks, chose the emerging field of explosives detection for his course paper, titled “Bomb Detection Technology Solutions.”
“I was particularly interested in exploring emergent stand-off technologies that could be employed by both technician and non-technical personnel from a distance,” said Weeks, who is now a doctoral student at the University of St. Andrews. “The goal was not to supplant the role or function of certified bomb technicians, but rather to determine whether technology had advanced enough to include a simplistic yet viable stand-off technology that could be used by fire and law enforcement personnel to assist them in making better decisions about specific kinds of responses.”

1. Engaging in this type of research would have been exceedingly narrow for the class, so Weeks extended his focus to include both trace and bulk explosion detection technologies. Typical trace detection technologies include: canine, chemiluminescence, chemical reagents, ion mobility, mass spectrometry, surface acoustic wave, thermo-redox, and ultraviolet fluorescence. Bulk detection technologies typically include: X-ray, computerized tomography (CT) fluoroscopy, neutron interrogation, and millimeter wave. Weeks looked at each technology separately in order to first understand how it worked, how it could be applied, and then made a comparison of its strengths and weaknesses to others in its class. In the end, several issues became apparent. First, the technology had become very specialized and its application was specific to narrowly defined environments. Second, there was no viable stand-off technology that could be employed reliably. Last, and most amazing to Weeks, the most versatile, mobile, , reprogrammable, reliable, and technologically advanced detection method remained the canine.

2. Weeks' research on this subject took place in late 2006. At the time, the city of Orange, Calif., where he worked, was committed to expanding the role of its fire and police personnel by providing them with advanced capability to detect and monitor CBRNE environments. The goal was two-fold. First, given the expanded threat environment that could no longer be ignored following the September 11, 2001 attacks, the city felt that it had an obligation to provide increased safety to its personnel and to the community. If safety could be increased through investments in technology, then the expense was justified. Second, in the event of multiple or simultaneous events, and higher trained personnel were not available or had a significantly delayed response, there was a desire to provide some form of advanced monitoring capability for their personnel.
3. As noted previously, there was no viable stand-off technology that could be employed reliably, so the city did not venture any further down that path. However, the city did begin purchasing some other advanced detection and protection equipment to expand its capability in CBRNE environments: M8 and M9 paper; AP2Ce detectors for chemical warfare agents including G,V, and mustard agents; an array of radiological detection equipment including personal dosimeters for all personnel; several 5 gas monitors for confined space operations; significant expansion of options for breathable air beyond SCBA; and level B and level C ensembles for all personnel.

Associated file: Bomb Detection Technology Solutions